Total No. of Questions : 5]

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SEAT No. :

[Total No. of Pages : 2

[5019]-301
T.Y.B.Sc.
BIOTECHNOLOGY
Bb - 331 : Microbial Biotechnology
(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in 2-4 lines **[20]**

a) Give the classification of micro-organisms on the basis of temperature requirement.
b) What is meant by continuous culture?
c) State the mode of action of chlorine in disinfection of water.
d) State two uses of dextran.
e) State in brief indigo biotransformation.
f) Define Z value
g) State two flavour defects of milk with proper examples.
h) Define yield coefficient and state its significance in microbial growth.
i) Mention the uses of GMOs in medicine.
j) Mention the use of micro-organisms in metal extraction.

Q2) Attempt any three of the following. **[15]**

a) State the molecular adaptations of thermophiles in extreme environments.
b) Comment on preservation of foods by freezing.
c) State the importance of BOD in water analysis.
d) State the biosafety norms in biotechnology.

Q3) Write short notes on any three **[15]**

a) Biosensors
b) Spoilage of canned foods.
c) Microbial polysaccharides
d) Rapid sand filter
e) Phosphatase test

P.T.O.

Q4) a) Describe the indirect tests used for grading of milk. **[8]**

OR

a) Describe the direct tests used for grading of milk. **[8]**

b) Describe with the help of flow chart the routine bacteriological analysis of water portability. **[7]**

Q5) a) Describe the disease poliomyelitis with respect to : causative agent, Types of poliomyelitis symptoms & prevention. **[8]**

OR

a) Describe food intoxication caused by staphylococcus aureus and Aspergillus flavus. **[8]**

b) Describe the role of activated sludge method as an effluent treatment method. **[7]**

Total No. of Questions : 6]

SEAT No. :

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[Total No. of Pages : 2

[5019]-302

T.Y. B.Sc.

BIOTECHNOLOGY

Bb - 332 : Plant and Animal Tissue Culture

(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Answer to each section should be written in separate answer book.***

SECTION - I

(Plant Tissue Culture)

Q1) Answer in brief : **[5 × 2 = 10]**

a) What is totipotency?
b) Enlist two applications of embryo culture.
c) What is somaclonal variation?
d) What are artificial seeds?
e) What are androgenic haploids?

Q2) Answer any four: **[4 × 5 = 20]**

a) Virus iradication can be accomplished by meristem culture. Justify.
b) What are plant growth regulators? Explain the use of any two.
c) What is clonal propagation? Give its applications.
d) What is protoplast fusion? Give any two methods of protoplast fusion.
e) Explain the various parameters to assess growth and development in vitro.
f) Enlist the various nutritional components used in a plant tissue culture medium and explain their use.

Q3) Answer any one: **[1 × 10 = 10]**

a) What is somatic embryogenesis? Describe the various stages of somatic embryo development. Add a note on its applications.
b) Discuss in detail the ways to obtain homozygous diploids. What is their importance.

P.T.O.

SECTION - II

(Animal Tissue Culture)

Q4) Answer the following in 2-3 sentences. **[5 × 2 = 10]**

a) Define cryomix

b) What is neoplastic transformation?

c) Explain the role of L-glutamine in ATC medium.

d) Comment on Tissue culture flasks.

e) Write any 2 applications of animal tissue culture.

Q5) Write short notes on : (any 4) **[4 × 5 = 20]**

a) 3 - dimensional cultures.

b) Advantages of serum over serum-free media.

c) Functions of a cell repository.

d) Determination of cell concentration using Neubaeur's chamber.

e) Importance of asceptic technique in animal tissue culture.

f) Buffering system in ATC media.

Q6) a) Define antigenic markers. Describe in detail any one method of cell characterisation using antigenic markers. **[10]**

OR

b) Define primary culture. Describe in detail a method to establish fibroblast culture. **[10]**

Total No. of Questions : 5]

SEAT No. :

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[Total No. of Pages : 2

[5019]-303
T.Y.B.Sc.
BIOTECHNOLOGY
Bb - 333 : Biodiversity and Systematics
(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instruction to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following in brief : **[10 × 2 = 20]**

a) What is ecological biodiversity?
b) Define : Territory
c) What is meant by parapatric speciation?
d) Enlist different biodiversity databases.
e) Explain commensalism
f) Define dominance hierarchy
g) What is meant by phage typing
h) Define : evenness
i) Magnitude of biodiversity
j) Define : functionally extinct

Q2) Write short notes on (any three) **[3 × 5 = 15]**

a) Brilleuin index of biodiversity
b) Age class distribution
c) Tundra Biome
d) Prey predater dynamics

Q3) Answer the following (any three) **[3 × 5 = 15]**

a) Innate behaviour in animals
b) Biodiversity policies of India.
c) Write a note on domesticated biodiversity
d) Give the role of genetic diversity in variation.

P.T.O.

Q4) Answer in brief

a) Give a detailed account of ex-situ conservation. **[8]**

b) Write a note on growth forms **[7]**

OR

a) Mention the need for classification. Add a note on embryology in classification system **[8]**

b) Explain in detail interspecific interactions in population **[7]**

Q5) Write short notes on (any three) **[3 × 5 = 15]**

a) Improtance of sanctuaries

b) Role of cyto taxonomy

c) Gamma diversity

d) Biodiversity hotspots in south America.

Total No. of Questions : 5]

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SEAT No. :

[Total No. of Pages : 2

[5019]-401

T.Y. B.Sc.

BIOTECHNOLOGY

Bb - 341 : Large Scale Manufacturing Process

(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer all the following in 2-3 lines. **[20]**

a) Define fermentation. Give examples.
b) What is downstream processing. Explain with example
c) What do you mean by strain improvement?
d) Explain - Batch fermentation process.
e) What are auxotrophic mutants?
f) Describe functions of impellers.
g) Explain the concept of inoculum development.
h) What is dummy variable?
i) Explain the term thermal death rate.
j) Comment on lyophilization.

Q2) Write short notes on (any three) **[3 × 5 = 15]**

a) Solid state fermentation
b) Role of precursors & inhibitors in media.
c) Gradient plate method for screening of industrially important micro-organisms.
d) Good manufacturing practices & good laboratory practices.

Q3) Attempt any three from following questions. **[3 × 5 = 15]**

a) Explain liquid - liquid extraction method for product recovery.
b) Explain foam control in fermentation process.
c) Comment on - Air-lift fermenters.
d) Describe the process of 'biotransformation' with example.

P.T.O.

Q4) a) Describe design of typical fermenter. Add a note on different parts & their function in brief. **[7]**

OR

a) Explain in detail continuous culture systems. Describe types of continuous cultures with applications.

b) What is bioprocess economies? Describe following terms with examples.

i) Fixed cost **[8]**

ii) Variable cost

iii) Amortized cost

iv) Depreciation

OR

b) Explain in detail mechanism of filtration & types of different filters used in product recovery.

Q5) Elaborate large scale manufacturing process of vitamin B_{12} with respect to production strain, inoculum build-up, production media & recovery. **[15]**

OR

Define sterilization. What is the need of sterilization? Describe different methods used for air & Media sterilization.

Total No. of Questions : 5]

SEAT No. :

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[Total No. of Pages : 2

[5019]-402

T.Y.B.Sc.

BIOTECHNOLOGY

Bb - 342 : Biochemical and Biophysical Techniques

(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instruction to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer all the following in 2-4 lines. **[20]**

a) What are polyprolic acids?

b) State beer's law.

c) Give the importance of fixation in microscopy

d) What is normality.

e) Define resolving power.

f) Enlist names of two fluorescent stains.

g) What is Electromagnetic radiation (EMR)?

h) Explain partition coefficient in chromatography.

i) Give any two advantages of thin-layer chromatography over paper chromatography.

j) What is meant by pI.

Q2) Attempt the following questions (any three) **[3 × 5 = 15]**

a) Explain the principle and applications of Gel filtration.

b) Distinguish between absorbance and emission spectroscopy

c) Write a note on laboratory safety methods.

d) How will you prepare

i) Solution A of 0.75M, volume 200ml (molecular weight of solute is 340)

ii) Using the above solution A, prepare 0.03M solution of same solute, of volume 110ml.

Q3) Write short notes any three **[3 × 5 = 15]**

a) Biological buffers

b) Cation exchange chromatography

c) Activity staining in electrophoresis

d) Phase-contrast microscopy

Q4) a) Give detailed account of confocal microscopy and its applications. **[8]**

OR

What is meant by U.V.spectroscopy. Give its principle and working in detail.

b) Explain principle, working and applications of pH-meter. **[7]**

OR

Discuss different staining methods used in light microscopy.

Q5) Attempt any one of the following **[15]**

a) Distinguish between partition and absorption chromatography. Give detailed account of Affinity chromatography.

OR

a) Discuss spectroscopy with respect to:

i) U.V. visible spectrum of EMR

ii) Molar extinction coefficent

iii) Chromophores

iv) Absorption spectra

v) Emission spectra

Total No. of Questions : 5]

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SEAT No. :

[Total No. of Pages : 2

[5019]-403
T.Y.B.Sc.
BIOTECHNOLOGY
Bb - 343 : Recombinant DNA Technology
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in 2-4 lines. **[10 × 2 = 20]**

a) Write down the contribution of Nathan and Smith in recombinant DNA Technology.

b) Give the properties of type II restriction enzymes.

c) What is α - complementation?

d) Mention the role of SDS and chilled ethanol in DNA isolation.

e) What is Blue-white screening?

f) Mention difference between probe and primer.

g) Enlist the high capacity vectors used in construction of genomic libraries

h) Give the application of PCR.

i) Differentiate between Genetic and physical mapping.

j) Write the important applications of Genetic Engineering.

Q2) Attempt the following questions (any three) **[3 × 5 = 15]**

a) Compare and contrast between Genomic and cDNA library.

b) Describe electroporation as a transformation technique.

c) Discuss in detail any one expression vector.

d) Describe various steps involved in RNA isolation.

P.T.O.

Q3) Write short notes on (any three) **[3 × 5 = 15]**

a) Cosmid vector

b) Type I restriction endonucleases.

c) Plasmid characterisation.

d) Applications of PCR.

Q4) a) Discuss in detail the technique of colony hybridization. **[8]**

OR

Explain the process for production of any one recombinant protein.

b) Explain DNA fingerprinting technique in detail. **[7]**

OR

Discuss in detail 'Insertional Inactivation'.

Q5) Attempt any one of the following **[15]**

Explain in detail automated method of DNA sequencing

OR

Write an assay on PCR covering the following points.

a) Components of PCR

b) Steps involved in PCR

c) Assessment of PCR product